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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/402,244	12/12/2000	Paul A. Insel	220002058901	5700

7590 05/20/2003

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EXAMINER
FREDMAN, JEFFREY NORMAN

ART UNIT	PAPER NUMBER
1634	

DATE MAILED: 05/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/402,244	INSEL ET AL.	
	Examiner	Art Unit	
	Jeffrey Fredman	1634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 March 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-38* is/are rejected.

7)☐ Claim(s) ____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s) _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-6, 11-16, 21-38 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In analysis of the claims for compliance with the written description requirement of 35 U.S.C. 112, first paragraph, the written description guidelines note regarding genus/species situations that "Satisfactory disclosure of a ``representative number'' depends on whether one of skill in the art would recognize that the applicant was in possession of the necessary common attributes or features of the elements possessed by the members of the genus in view of the species disclosed." (See: Federal Register: December 21, 1999 (Volume 64, Number 244), revised guidelines for written description.)

The current claims have two different problems with regard to descriptive support. First, all of the current claims encompass a genus of nucleic acids which are different from those disclosed in the specification. The genus includes variants for which no written description is provided in the specification. The variation is permitted by both the broad nature of claim 1 which is drawn to any primers which amplify any

gene named human alpha-1B adrenergic receptor, including any allelic variants, insertions or deletions thereof. This large genus is represented in the specification by only the particularly named SEQ ID Nos. Thus, applicant has express possession of only a few human alpha-1B adrenergic receptor primers, in a genus which comprises hundreds of millions of different possibilities. Here, no common element or attributes of the sequences are required. Many of the claims have no structural limitations or requirements which provide guidance on the identification of sequences which meet these functional limitations is provided. Further, these claims encompass alternately spliced versions of the proteins, allelic variants including insertions and mutations, inactive precursor proteins which have a removable amino terminal end, and only specific amino acid sequences have been provided. No written description of alleles, of upstream or downstream regions containing additional sequence, or of alternative splice variants has been provided in the specification.

The second description problem relates to the scope of the diagnosis. The current claims permit diagnosis of any disease while the specification only discloses association of nocturnal asthma or essential hypertension with the specific glycine 16 polymorphism in the human alpha-1B adrenergic receptor gene. Thus, the current claims do not provide any descriptive support for other diseases associated with this polymorphism.

It is noted in the recently decided case The Regents of the University of California v. Eli Lilly and Co. 43 USPQ2d 1398 (Fed. Cir. 1997) decision by the CAFC that

> "A definition by function, as we have previously indicated, does not suffice to define the genus because it is only an indication of what the gene does, rather than what it is. See Fiers, 984 F.2d at 1169- 71, 25 USPQ2d at 1605- 06 (discussing Amgen). It is only a definition of a useful result rather than a definition of what achieves that result. Many such genes may achieve that result. The description requirement of the patent statute requires a description of an invention, not an indication of a result that one might achieve if one made that invention. See In re Wilder, 736 F.2d 1516, 1521, 222 USPQ 369, 372- 73 (Fed. Cir. 1984) (affirming rejection because the specification does "little more than outlin[e] goals appellants hope the claimed invention achieves and the problems the invention will hopefully ameliorate."). Accordingly, naming a type of material generally known to exist, in the absence of knowledge as to what that material consists of, is not a description of that material. "

In the current situation, the definition of the primers of the human alpha-1B adrenergic receptor gene without any specific structure, is precisely the situation of naming a type of material which is generally known to likely exist, but, except for the specific examples given, is in the absence of knowledge of the material composition and fails to provide descriptive support for the generic claim.

It is noted that in Fiers v. Sugano (25 USPQ2d, 1601), the Fed. Cir. concluded that

> "...if inventor is unable to envision detailed chemical structure of DNA sequence coding for specific protein, as well as method of obtaining it, then conception is not achieved until reduction to practice has occurred, that is, until after gene has been isolated...conception of any chemical substance, requires definition of that substance other than by its functional utility."

The current situation is a definition of the compound solely but its functional utility, as a deletion, without any definition of the particular deletions claimed.

In the instant application, certain specific SEQ ID NOs are described. Also, in Vas-Cath Inc. v. Mahurkar (19 USPQ2d 1111, CAFC 1991), it was concluded that:

> "...applicant must also convey, with reasonable clarity to those skilled in art, that applicant, as of filing date sought, was in possession of invention, with invention being, for purposes of "written description" inquiry, whatever is presently claimed."

In the application at the time of filing, there is no record or description which would demonstrate conception of any nucleic acids other than those expressly disclosed. Therefore, the claims fail to meet the written description requirement by encompassing sequences which are not described in the specification.

3. Claims 24, 25, 29-31, 33 and 34 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for diagnosis of nocturnal asthma and essential hypertension by association with the glycine 16 polymorphism, does not reasonably provide enablement for diagnosis of any other disease or the particular diseases with other polymorphisms. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims.

Factors to be considered in determining whether a disclosure meets the enablement requirement of 35 USC 112, first paragraph, have been described by the court in *In re Wands*, 8 USPQ2d 1400 (CA FC 1988). *Wands* states at page 1404,

> "Factors to be considered in determining whether a disclosure would require undue experimentation have been summarized by the board in Ex parte Forman. They include (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims."

The nature of the invention

The claims are drawn to a methods of diagnosing disease in a subject comprising the steps of determining alleles of the human alpha-1B adrenergic receptor gene. The invention is is an class of invention which the CAFC has characterized as "the unpredictable arts such as chemistry and biology." Mycogen Plant Sci., Inc. v. Monsanto Co., 243 F.3d 1316, 1330 (Fed. Cir. 2001).

The breadth of the claims

The claims encompass diagnosis of any disease by determining alleles in the alpha-1B adrenergic receptor gene. No specific polymorphisms other than the glycine 16 polymorphism are identified. No specific diseases other than nocturnal asthma and essential hypertension are associated with the glycine 16 polymorphism or any other polymorphism in the alpha-1B adrenergic receptor gene. No specific type of disease is recited and thus the claims encompass all diseases, which besides potentially including all forms of cancer also can include many other disease states such as Crohn's disease, metastatic abscesses, or metastatic spinal cord compression . No specific sequences are recited for the alpha-1B adrenergic receptor gene so these claim terms broadly encompass any sequence which can be so named.

Quantity of Experimenation

The quantity of experimentation in this area is extremely large since determination of the diagnostic efficacy of any particular polymorphism with any particular disease would require identification of a disease cohort, analysis of the entire cohort for the polymorphism, and performance of this method on a large enough sample to be statistically significant. This would require significant inventive effort, with each of

the many intervening steps, upon effective reduction to practice, not providing any guarantee of success in the succeeding steps.

The unpredictability of the art and the state of the prior art

This is a very unpredictable art in which knowledge of a polymorphism does not necessarily mean that the polymorphism is associated with disease. For example, Lavandero et al, Faseb J. (2002) 16(4) :A587 (abstract only) teaches that a polymorphisms at glycine 16 and at position 27 of the angiotensin beta2 receptor gene are not associated with heart failure (see abstract). Further, Fatemi et al, Eur. J. Pediatrics (2002) 161:337-339 (abstract only) teaches that the Trp64Arg allele of the beta3 adrenergic receptor is not associated with sudden infant death syndrome (see abstract). Also, Santos et al, Nutrition (2002) 18(3) :255-8 (abstract only) teaches that a Glu27 allele of the beta2 adrenergic receptor is not clearly associated with bodymass index or other cardiovascular risks (see abstract). Lastly, Lin et al, Am J. Hypertension (2002) 14(12):1201-4 teach that the same Glu 27 allele was excluded from association with hypertension (see abstract). Thus, the prior art shows that it is very unpredictable whether any specific allele will be associated with any specific disease.

Working Examples

The specification has one working example of a polymorphism which is associated with two particular diseases. There are no other working examples.

Guidance in the Specification

The specification, while providing a general review of methods to diagnose disease does not provide teachings sufficient to overcome doubts raised in the art with regards to the association of unknown polymorphisms with any disease, whether known or still unknown. It would essentially be a trial and error process to make and use the many possible diverse species of polymorphism encompassed by the claims in order to diagnose any particular disease.

Level of Skill in the Art

The level of skill in the art is deemed to be high.

Conclusion

In the instant case, as discussed above, the level of unpredictability in the art is high as shown by the cited prior art, the specification provides one with little description or guidance that leads one to a reliable method of diagnosis. One of skill in the art cannot readily anticipate the effect of a change within the subject matter to which the claimed invention pertains . Further the specification does not provide guidance to overcome art recognized problems in diagnosis required to actually use the diagnostic methods as broadly claimed. Thus given the broad claims in an art whose nature is identified as unpredictable, the unpredictability of that art, the large quantity of research required to define these unpredictable variables, the lack of guidance provided in the specification, the small number of working examples and the negative teachings in the prior art balanced only against the high skill level in the art, it is the position of the examiner that it would require undue experimentation for one of skill in the art to perform the method of the claim as broadly written.

4. The rejection of claims 3-6 and 13-16 under 35 U.S.C. 112, second paragraph, is withdrawn in view of the amendment.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year *prior* to the date of application for patent in the United States.

6. Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by SYNAPTIC PHARMACEUTICAL CORPORATION (WO 94/08040).

SYNAPTIC PHARMACEUTICAL CORPORATION teaches a method of amplifying a segment of human I1b adrenergic receptor gene comprising the steps of: a) providing a biological sample of the subject containing nucleic acids (page 55, lines 18-24), b) amplifying a segment of the gene using oligonucleotide primers, DNA polymerase and dNTPs (page 55, lines 18-35).

SYNAPTIC PHARMACEUTICAL CORPORATION teaches oligonucleotide primer pairs for the amplification of an alpha 1b adrenergic receptor which are greater in length than 15 nucleotides, which are non-crosshybridizing, which anneal to two distinct regions about 400 nucleotides apart with melting temperatures over 50 C (page 55, lines 23-37).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 1-14, 16-20, 21, 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over obvious over SYNAPTIC PHARMACEUTICAL CORPORATION (WO 94/08040) in view of Ramarao et al (J. Biol. Chem. (1992) 267(30):21936-21945) and further in view of Emorine et al (Proc. Natl. Acad. Sci. (1987) 84:6995-6999).

SYNAPTIC PHARMACEUTICAL CORPORATION teaches a method of amplifying a segment of human I1b adrenergic receptor gene comprising the steps of: a) providing a biological sample of the subject containing nucleic acids (page 55, lines 18-24), b) amplifying a segment of the gene using oligonucleotide primers, DNA polymerase and dNTPs (page 55, lines 18-35).

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regions about 400 nucleotides apart with melting temperatures over 50 C (page 55, lines 23-37).

SYNAPTIC PHARMACEUTICAL CORPORATION further teaches methods for diagnosis of diseases related to human alpha 1 adrenergic receptors comprising nucleic acid probe techniques (page 12, lines 10-32). SYNAPTIC PHARMACEUTICAL CORPORATION expressly teaches a variety of diseases including hypertension which are related to alterations in alpha 1 adrenergic receptor activity (page 73, line 32 to page 74, line 19). SYNAPTIC PHARMACEUTICAL CORPORATION expressly teaches an oligonucleotide sequence which comprises SEQ ID NO:s 1-38. Here are the alignments, as drawn from figure 2 for SEQ ID NO: 1;

```
  Query Match           100.0%;  Score 19;  DB 22;  Length 1738;
  Best Local Similarity 100.0%;  Pred. No. 4.45e-01;
  Matches    19;  Conservative    0;  Mismatches   0;  Indels
0;  Gaps   0;
Db      31 CGGGGGAAGCAAAGTTTCA 49
           |||||||||||||||||||
Qy       1 CGGGGGAAGCAAAGTTTCA 19
```

for SEQ ID NO: 2;

```
  Query Match           100.0%;  Score 20;  DB 22;  Length 1738;
  Best Local Similarity 100.0%;  Pred. No. 8.61e-03;
  Matches    20;  Conservative    0;  Mismatches   0;  Indels
0;  Gaps   0;

Db     778 ATTCTAGTCATGTACTGCCG 797
           ||||||||||||||||||||
Cp      20 ATTCTAGTCATGTACTGCCG 1
```

for SEQ ID NO: 3;

```
  Query Match           100.0%;  Score 19;  DB 22;  Length 1738;
  Best Local Similarity 100.0%;  Pred. No. 2.90e-01;
  Matches    19;  Conservative    0;  Mismatches   0;  Indels
0;  Gaps   0;
```

```
Db     662 CTCTCCTTGGGTGGAAGGA 680
           ||||||||||||||||||
Qy       1 CTCTCCTTGGGTGGAAGGA 19
```

Ramarao teaches an oligonucleotide sequence which comprises SEQ ID NO:4.
for SEQ ID NO: 4;

```
  Query Match           100.0%;  Score 20;  DB 26;  Length 2669;
  Best Local Similarity 100.0%;  Pred. No. 6.52e-02;
  Matches    20;  Conservative    0;  Mismatches   0;  Indels
0;  Gaps   0;

Db    1919 CTTGGGTTTACTGATGAGCT 1938
           ||||||||||||||||||||
Cp      20 CTTGGGTTTACTGATGAGCT 1
```

Emorine teaches an oligonucleotide sequence which comprises SEQ ID NO:5, 6 and 8.
for SEQ ID NO: 5;

```
  Query Match           100.0%;  Score 20;  DB 26;  Length 3458;
  Best Local Similarity 100.0%;  Pred. No. 2.67e-02;
  Matches    20;  Conservative    0;  Mismatches   0;  Indels
0;  Gaps   0;

Db    1161 GAATGAGGCTTCCAGGCGTC 1180
           ||||||||||||||||||||
Qy       1 GAATGAGGCTTCCAGGCGTC 20
```

for SEQ ID NO: 6;

```
  Query Match           100.0%;  Score 19;  DB 26;  Length 3458;
  Best Local Similarity 100.0%;  Pred. No. 3.40e-02;
  Matches    19;  Conservative    0;  Mismatches   0;  Indels
0;  Gaps   0;

Db    2079 CAAGACGTTAGGCATCATC 2097
           |||||||||||||||||||
Cp      19 CAAGACGTTAGGCATCATC 1
```

for SEQ ID NO: 8

```
  Query Match          100.0%;  Score 19;  DB 26;  Length 3458;
  Best Local Similarity 100.0%;  Pred. No. 3.40e-02;
  Matches    19;  Conservative    0;  Mismatches   0;  Indels
0;  Gaps   0;

Cp     1    tcctctaggactaaagctc 19
            ||||||||||||||||||
Db: 2769    tcctctaggactaaagctc 2751
```

It would have been prima facie obvious to one having ordinary skill in the art at the time the invention was made to select human alpha 1b adrenergic primers from the sequences of Emorine or Ramarao or SYNAPTIC PHARMACEUTICAL CORPORATION since SYNAPTIC PHARMACEUTICAL CORPORATION states "This invention provides a nucleic acid probe comprising a nucleic acid probe molecule of at least 15 nucleotides capable of specifically hybridizing with a sequence included within the sequence of a nucleic acid molecule encoded by a human alpha 1b receptor (page 5, lines 16-21)". An ordinary practitioner, given these sequences would have recognized that the claimed primers simply represent structural homologs, which are suggested by the prior art in a gene designated as useful for PCR amplification, and concerning which a biochemist of ordinary skill would attempt to obtain alternate compounds with improved properties, the claimed primers and probes are prima facie obvious over the cited references in the absence of secondary considerations. Further, selection of the specific oligonucleotides from a larger known gene sequence represents routine optimization with regard to sequence, length and compositions, which routine optimization parameters are explicitly recognized in the cited prior art of

Bard. Routine optimization is not considered inventive and no evidence has been presented that the probe selection performed was other than routine, that the products resulting from the optimization have any unexpected properties, or that the results should be considered unexpected in any way as compared to the closest prior art.

10. Claims 1, 2, 11, 12 and 21-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over SYNAPTIC PHARMACEUTICAL CORPORATION (WO 94/08040) in view of Cotton et al (Current Opinion in Biotechnol (1992) 3:24-30) .

SYNAPTIC PHARMACEUTICAL CORPORATION teaches a method of amplifying a segment of human I1b adrenergic receptor gene comprising the steps of: a) providing a biological sample of the subject containing nucleic acids (page 55, lines 18-24), b) amplifying a segment of the gene using oligonucleotide primers, DNA polymerase and dNTPs (page 55, lines 18-35).

SYNAPTIC PHARMACEUTICAL CORPORATION teaches oligonucleotide primer pairs for the amplification of an alpha 1b adrenergic receptor which are greater in length than 15 nucleotides, which are non-crosshybridizing, which anneal to two distinct regions about 400 nucleotides apart with melting temperatures over 50 C (page 55, lines 23-37).

SYNAPTIC PHARMACEUTICAL CORPORATION further teaches methods for diagnosis of diseases related to human alpha 1 adrenergic receptors comprising nucleic acid probe techniques (page 12, lines 10-32). SYNAPTIC PHARMACEUTICAL CORPORATION expressly teaches a variety of diseases including hypertension,

prostatic disorders, nasal congestions such as asthma, which are related to alterations in alpha 1 adrenergic receptor activity (page 73, line 32 to page 74, line 19).

SYNAPTIC PHARMACEUTICAL CORPORATION does not teach the broad methods of mutation detection for analysis of patient samples.

Cotton teaches a variety of methods, which may initiate with PCR amplified nucleic acids (page 24, column 2), for the detection of mutations in patients (page 24, columns 1 and 2). Cotton expressly teaches allele specific amplification (page 27, column 1), allele specific oligonucleotides (page 26, column 2), PCR fingerprinting using southern blot analysis (page 26, column 2) as well as gradient gel electrophoresis and SSCP (page 25).

It would have been prima facie obvious to one of ordinary skill at the time the invention was made that the diagnostic method of SYNAPTIC PHARMACEUTICAL CORPORATION could be enhanced with the variety of PCR based methods of Cotton since Cotton states "The worker interested in detecting mutations has an increasing number of improving technologies to choose from. (page 27, column 2)". An ordinary practitioner would have been motivated to diagnose the mutation based diseases of SYNAPTIC PHARMACEUTICAL CORPORATION using any of the improving technologies of Cotton since they are useful and well defined mutation detection systems which are easy to perform.

Response to Arguments

Applicant's arguments filed on March 5, 2003 have been fully considered but are not found persuasive.

Applicant argues the written description rejection based on several different grounds. First, the Applicant argues that the examiner has not met the burden of explaining why the claims do not provide a written description of the invention. Second, Applicant argues that the claims do not encompass a genus of nucleic acids which differs from those disclosed in the specification. Third, Applicant argues that there is adequate description for diagnosis of disease.

Applicant points to the limitations in the claims, particularly claim 1, and argues that the limitation to primers which are 15 nucleotides in length, non self hybridizing, which hybridize to SEQ ID NO: 9, have a Tm from 50-85 and are a set distance apart represents a genus which has been sufficiently disclosed in the specification to comply with the written description requirement and that the rejection does not explain why the claims fail this requirement.

This argument is not found persuasive because it fails to recognize that the essence of the written description requirement, as enunciated by the Court in Lilly states that " A definition by function ... does not suffice to define the genus." Every limitation identified in those claims listed represents a definition by function. Unlike claim 7 for example, which is structurally limited to comprising SEQ ID NO: 1 and SEQ ID NO: 2, and therefore is defined by structure, the rejected claims are solely defined by function. While SEQ ID NO:s 1 and 2 fall into the genus recited in claim, so would literally

hundreds of millions of other sequences which are not described or disclosed by Applicant in any way other than functionally.

It is clear that other useful members of this genus may exist which differ based upon one of a number of parameters. For example, SEQ ID NO: 1 may overlap a polymorphism found in some people while SEQ ID NO: 2 may overlap a splice site which forms a different variant in some people but not in others. However, Applicant has not disclosed such variation. Other than by trial and error sequencing of humans with allelic variations of the human B2 adrenergic receptor, no description of these, or any other species is provided by the specification. Just as the court in Fiers found that the claim at issue, drawn to a DNA sequence, "just represents a wish, or arguably a plan, for obtaining the DNA" (Fiers at 984 F.2d 1171) here too, the claim is a wish for not only all of the primers which could be derived directly from the structure of the sequence, but for any primer which could be derived from undisclosed variants of the adrenergic receptor sequence.

With respect to Applicants argument that the claims do not encompass a genus of nucleic acids different from those disclosed in the specification, relying on the functional characteristics and the eight illustrative primers, this argument begs the point. If SEQ ID NO: 1 is the 19 mer cgggggaagcaaagtttca, which has a calculated Tm of 51 C, then an alteration (in bold) of SEQ ID NO: 1, which would still hybridize under stringent conditions such as c**C**gggggaagcaaagtttca. This sequence also has a Tm of 51 C and meets applicant's other requirements. However, this species, while within the claimed genus, has no structural description in the specification. It is only identified by

functional elements in the claim. There are literally hundreds of millions of other such species which are identified by functional elements. Some of these may indeed be associated with other diseases, but Applicant has not made that association. Some of these may be associated with altered protein function, but Applicant has not made that association. Some of these may be associated with differential expression or differential splicing, but Applicant has not made that association. Therefore, given this immense genus, which may include many associations, for which Applicant has shown only the association of the Glycine point mutation shown in the specification, Applicant has not provided a written description commensurate in size with the claimed genus.

Lastly, Applicant argues that there is sufficient description to warrant a broad claim of association with disease. This argument relies upon the association which Applicant has demonstrated with a particular disease, Asthma, but attempts to claim any disease. Applicant particularly points to a list which includes an enormous and diverse list of diseases ranging from any cardiovascular disease to any disease within the realm of the psychiatrist (see response at page 17, paragraph 1). As the District Court in University of Rochester v. G.D. Searle & Co., Inc. (2003 WL 759719 W.D.N.Y.,2003. March 5, 2003.) noted "In effect, then, the '850 **patent** claims a method that cannot be practiced until one discovers a compound that was not in the possession of, or known to, the inventors themselves. Putting the claimed method into practice awaited someone actually discovering a necessary component of the invention." This is similar to the current case since the method of diagnosis claimed cannot actually be practiced until someone discovers a disease association with the B2 adrenergic

receptor that was not in the possession of, or known to the current inventors. Without such knowledge by the current inventors, there is no possession of the diagnostic method using the B2 adrenergic receptor, only a wish to possess such a method.

Applicant then argues the enablement rejection. Applicant argues that there would not be undue experimentation in using the method because the specification teaches the general methods of the procedure. Applicant then addresses some of the enablement factors. Applicant cites post filing date art that disclose other associations. First, with regard to the citation of post filing date art, MPEP 2164.05(a) makes clear that "Publications dated after the filing date providing information publicly first disclosed after the filing date generally cannot be used to show what was known at the time of filing." Therefore, these articles are not relevant to the enablement inquiry.

Consequently, when the proper time period is reviewed with regard to the showing of other alterations in the B2 adrenergic receptor that are associated with disease, only the single working example disclosed by Applicant is found.

Applicant then argues that that the quantity of experimentation is not undue because the experimentation is routine. This belies the nature of this invention. It is not routine experimentation to find that a particular polymorphism is associated with a particular disease. It is not routine because there is absolutely no predictability that a particular disease will be associated with a particular gene. Further, the literature is studded with examples, as discussed in the rejection, where genes were thought to be associated with a disease but this association was refuted. As noted previously, four different authors, Lavandero, Fatemi, Santos and Lin, attempted to perform the method

which Applicant terms "routine" and all four failed to achieve a useful result. Consequently, it is still found that a high quantity of experimentation is necessary.

When Applicant then addresses the unpredictability factor, Applicant argues that the four cited prior art studies which failed to find an association in this gene are rebutted because two later publications found some associations. First, as noted above, the later published art cannot properly be used in responding the the enablement argument. Second, this argument fails of its own weight since this actually further supports the unpredictability where some studies find and others fail to find associations of the B2 adrenergic receptor gene with disease.

Therefore, the enablement rejection will be maintained.

As noted above, the rejection under 35 USC 112, second paragraph is withdrawn in view of the amendment.

Applicant then argues the 102 rejection over the WO 94/08040 patent because the primers are not separated by 400 nucleotides. The claim states "about 400 nucleotides" not "at least 400 nucleotides" Consequently, the rejection is maintained because 280 is deemed to be "about 400".

Applicant then argues the 103 rejection by noting that there is no motivation to combine the references. This is not found persuasive as the rejection recites express motivation, specifically "An ordinary practitioner, given these sequences would have recognized that the claimed primers simply represent structural homologs, which are suggested by the prior art in a gene designated as useful for PCR amplification, and concerning which a biochemist of ordinary skill would attempt to obtain alternate

compounds with improved properties, the claimed primers and probes are prima facie obvious over the cited references in the absence of secondary considerations." Applicant has not rebutted the argument such selection is routine.

Applicant argues with regard to the rejection relying upon Cotton that this is hindsight. However, "[a]ny judgement on obviousness is in a sense necessarily a reconstruction based on hindsight reasoning, but so long as it takes into account only knowledge which was within the level of ordinary skill in the art at the time the claimed invention was made and does not include knowledge gleaned only from applicant's disclosure, such a reconstruction is proper." *In re McLaughlin* 443 F.2d 1392, 1395, 170 USPQ 209, 212 (CCPA 1971).

These rejections are maintained.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey Fredman whose telephone number is 703-308-6568. The examiner can normally be reached on 6:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on 703-308-1119. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3014 for regular communications and 703-305-3014 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0196.

Jeffrey Fredman
Primary Examiner
Art Unit 1637

May 13, 2003